

WHAT IS CLAIMED IS:

	_ 1	1. A method fo	r controlling an industrial process, the method
N	2	comprising;	
M	/3	outputting a plurali	y of parameters from a process for manufacture of a
	4	substance;	
	5	using each of the pl	urality of parameters in a computer aided process, the
	6	computer aided process comparing	at least two of the plurality of parameters against a
	7	training set of parameters, the train	ing set of parameters being predetermined;
	8 -	determining if the a	t least two of the plurality of parameters are within a
	9	predetermined range of the training	set of parameters; and
	10	outputting a result b	ased upon the determining step.
	1	2. The method	of claim 1 wherein the substance is selected from a
O	2	petroleum product, a chemical prod	luct, a food product, a health product, a cleaning
	3	product, a biological product, and o	other fluid or objects.
ļ.	1	3. The method	of claim 1 wherein the plurality of parameters are
	2	selected from an intrinsic element of	or an extrinsic element of the process.
IJ	1	4. The method	of claim 1 wherein the using, determining, and
16 (1.2) (1.3) (2.3) (2.3) (2.4)	2	outputting are provided in a compu	ter software program.
1-	1	5. The method	of claim wherein the computer aided process
	2	includes an algorithm selected from	1 PCA, HOA, KNN CV KNN Prd, SIMCA CV,
	3	SIMCA Prd, Canon Prd, SCREAM	I, and Fisher CV.
	1	6. The method	of claim 1 further comprising normalizing each of the
	2	plurality of parameters before the u	sing step.
	1	7. The method	of claim 1 further comprising adjusting a base line of
	2	each of the plurality of parameters	before the using step.
	1	8. The method	of claim 1 wherein the result is an affirmative response
	2	or a negative response, where the r	esponse is displayed on a terminal.

	1	9. The method of claim I wherein the computer aided process is
	2	selected from a library comprising a plurality of processes for performing the comparing
	3	step.
	1	10. The method of claim 9 wherein the plurality of processes includes
	2	at least a comparing process, a contrasting process, and a functional process.
	1	11. A method for monitoring an industrial process for the manufacture
	2	of materials, the method comprising:
	3	inputting a plurality of process parameters from a process for manufacture
	4	of a substance;
	5	selecting one of a plurality of computer aided processes, each of the
	6	computer aided processes being capable of determining an output based upon a training
	7	set of the plurality of process parameters;
7	8	using each of the plurality of parameters in the selected computer aided
nd Jr. mal thu thy that the first	9	process, the selected computer aided process comparing at least two of the plurality of
	10	process parameters against a training set of parameters;
Ē.	11	determining if the at least two of the plurality of process parameters are
, may	12	within a predetermined range of the training set of parameters; and
ind' tudt tude tun tan	13	outputting a result based upon the determining step.
	1	The weether of a laine 11 wherein the substance is selected from a
•	1	12. The method of claim 11 wherein the substance is selected from a
	2	petroleum product, a chemical product, a food product, a health product, a cleaning
	3	product, a biological product, and other fluid or objects.
	1	13. The method of claim 11 wherein the plurality of process
	2	parameters are selected from an intrinsic element or an extrinsic element of the process.
	1	14. The method of claim 11 wherein the using, determining, and
	2	outputting are provided in a computer software program.
	1	15. The method of claim 1 wherein the computer aided process
	2	includes an algorithm selected from PCA, HQA, KNN CV KNN Prd, SIMCA CV,
	3	SIMCA Prd, Canon Prd, SCREAM, and Fisher CV.

1	16. The method of claim 11 further comprising normalizing each of
2	the plurality of parameters before the using step.
1	17. The method of claim 11 further comprising adjusting a base line of
2	each of the plurality of parameters before the using step.
1	18. The method of claim 11 wherein the result is an affirmative
2	response or a negative response, where the response is displayed on a terminal.
1	19. The method of claim 11 wherein the computer aided process is
2	selected from a library comprising a plurality of processes for performing the comparing
3	step.
1	20. The method of claim 19 wherein the plurality of processes includes
2	at least a comparing process, a contrasting process, and a functional process.
1	21. A method for identifying a mode of operation in an industrial
2	process, the method comprising:
3	running an industrial process, the industrial process being characterized by
4	a plurality of parameters at an in-process state of a substance or object being
5	manufactured, each of the parameters defining a characteristic of the substance or the
6	object in the in-process state;
7	converting each of the parameters into an electronic form;
8	inputting each of the plurality of parameters through a preprocessing
9	method to increase a signal to noise ratio of one or more of the plurality of parameters,
10	the preprocessing method being preselected based upon a training set of parameters that
11	improved the signal to noise ration of the one or more parameters;
12	processing the preprocessed parameters through a computer aided process
13	to form a descriptor from the preprocessed parameters, the computer aided process being
14	selected from a plurality of computer aided processes based upon a training set of
15	parameters;
16	determining if the descriptor is within a selected class from a plurality of
17	classes; and
18	outputting a result based upon the determining step.

1	22. A method for determining an acceptability of a process, the method
2	comprising:
3	identifying a plurality of process parameters from a process for
4	manufacture of a substance;
5	using one of the selected computer aided processes out of a plurality of
6	computer aided processes, the selected computer aided process being derived from a
7	training set of the plurality of process parameters;
8	determining an acceptability of the process using each of the plurality of
9	parameters in the selected computer aided process, the selected computer aided process
10	comparing at least two of the plurality of process parameters against a training set of
11	parameters; and
12	outputting a result based upon the acceptability of the process.
1	23. A method for monitoring a process, the method comprising:
2	storing a first model in a memory;
3	acquiring data from a process;
4	applying the first model to the data to identify a first predicted descriptor
5	characteristic of a state of the process; and
6	consulting a first knowledge based system to provide an output based upor
7	the first predicted descriptor.
1	24. The method of claim 23 wherein the model is constructed from a
2	mathematical equation describing a physical law.
1	25. The method of claim 23 further comprising preprocessing the data
2	prior to applying the model.
1	26. The method of claim wherein the output is communicated to
2	control the process by adjusting an operational parameter of the process.
1	27. The method of claim 23 wherein the output is communicated to a
2	human operator to permit monitoring of the process.
1	28. The method of claim 23 wherein the output is resident on a server
2	and accessible to a user through a browser software program.
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1	29. The method of claim 28 wherein the input is acquired from the
2	process over a network of computers
1	30. The method of claim 23 wherein the input is acquired from the
2	process over a network of computers
1	The method of claim 23 wherein the output is communicated over
2	a network to an associated system, the associated system including at least one of a legacy
3	system, an e-enterprise system, and a desktop application.
5	system, an e-enterprise system, and a desktop application.
1	32. The method of claim 23 wherein the first knowledge based system
2	is an expert system.
1	33. The method of claim 23 further comprising:
2	acquiring initial data from a source at a first time;
3	converting the initial data into electronic form;
4	loading the initial data into memory;
5	retrieving the initial data from memory;
6	acquiring subsequent data from the source at a second time;
7	assigning a first descriptor to the initial data and a second descriptor to the
8	subsequent data;
9	constructing the model based upon the initial data, the subsequent data, the
10	first descriptor, and the second descriptor; and
11	storing the model in memory.
1	34. The method of claim 33 wherein the model is constructed from one
2.	of a univariate statistical technique, a multivariate statistical technique, a neural-based
3	approach, and a time series analysis.
1	35. The method of claim 33 wherein the model is constructed from one
2	of a group of different algorithms stored in a library.
1	36. The method of claim 33 wherein the source is in communication
2	with the process, the initial data and the subsequent data reflecting prior operation of the
3	process.

1	37. The method of claim 33 wherein the source is in communication
2	with a second process similar to the process, the initial data and the subsequent data
3	reflecting operation of the second process.
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1	38. The method of claim 33 further comprising:
2	constructing a second model;
3	storing the second model in memory;
4	applying the second model to the process data to identify a second
5	predicted descriptor characteristic of the process data; and
6	consulting the first knowledge based system to produce the output based
7	upon the first predicted descriptor and the second predicted descriptor.
1	39. The method of claim 38 wherein the second model is constructed
2	based upon the initial data, the subsequent data, the first descriptor, and the second
3	descriptor, such that comparison of the first descriptor and the second descriptor
4	represents a cross-validation.
1	40. The method of claim 38 wherein the second model is constructed
2	from operation of a second process similar to the process, such that comparison of the
3	first descriptor to the second descriptor represents an external validation
1	41. The method of claim 38 wherein the knowledge based system is an
2	expert system.
1	42. The method of claim 38 wherein a difference between the first
2	predicted descriptor and the second predicted descriptor is resolved by a second expert
3	system.
1	43. The method claim 23 further comprising receiving key preliminary
2	information and communicating the key preliminary information downstream to the first
3	model, such that the first predicted descriptor reflects the key preliminary information.